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Abstract

Although games are an integral part of the modern human experience, much focus has been placed on the involvement of more violent in-game content in the increase in likelihood of hostile and aggressive tendencies, as well as emotional reactivity, criminal activity, and mental instability. However, compelling data has suggested that trait aggression, the level of innate aggression relating to personality differences, may play a primary role in game preference. To test for relationships between trait aggression and game preference, the Buss-Perry Aggression Questionnaire, a game omnibus, and a short demographic survey were administered to psychology students at Texas A&M University—Commerce. Correlative analysis of game preference and trait aggression indicated significant results, implying strong relationships between aggression subtypes and game preference, with those testing high in aggression generally preferring more violent games. Gender also shows strong mediating influence, with males preferring more violent games and females preferring less violent games. Gender-segregated testing suggested aggressive males typically preferred more violent games and aggressive females generally did not prefer gaming. Social immersion, religiosity, and socioeconomic standing reported significant and compelling data. Trait aggression, along with potential combinations of gender, social immersion, religiosity, and socioeconomic standing, seems to play an important deterministic role in the development of game preference, and further research should be conducted on the interplay between these variables.

Keywords: trait aggression, game preference, violent gaming

Aggressive Gaming: A Study of Game Preference and Trait Aggression

Videogames have been vilified as a cause of cognitive incapability and mental decay, and even considered predictors of mental illness (Ferguson et al., 2008). As Ferguson further notes, conspiracy theorists and social psychologists alike have associated videogames with an array of negative effects and perpetuated this stereotype in popular culture. Since the release of *Death Race* in the 1970s, a game in which the objective of running over gremlins in a car was purported to condone civilian massacre, and as more violent themes have been incorporated into videogames, this array has grown to incorporate mental and emotional instability, aggression, and violent crime. The purported negative effects of indulging in violent videogame play have even been viewed as contributive to such incidents as the Columbine shooting of 1999 and the Virginia Tech massacre of 2007 (Ferguson, 2007).

However, as Ferguson and others note, it is certain that not all criminals have engaged in repeated videogame play, so one should naturally question whether the ties between the two are as causal as has been suggested. Instead of the supposition that violent videogames cause criminals (or people in general) to behave aggressively, perhaps the opposite correlation exists. That is, that aggressive people prefer aggressive gaming.

Physiological Arousal and Hostile Thoughts

The effect of game violence on physiological arousal and hostile thought has been explored in detail. An illustrative example is a study by Ballard and Wiest (1996), in which subjects were randomly assigned to play one of three videogames (*Mortal Kombat* [with blood], *Mortal Kombat* [with no blood], and *Corner Pocket*) and subsequently measured for change in heart rate and blood pressure. Results indicated a significant difference between participants who played the violent games and the nonviolent game, as well as between the more violent version

of *Mortal Kombat* and the less violent version of the same game, with the first group in each pair reporting greater heart rate and blood pressure. In a more recent conceptual replication, Fleming and Rickwood (2001) assigned subjects to a non-videogame (maze), a nonviolent videogame (*Bouncer II*), and a violent videogame (*Herc's Adventures*) and reported similar findings.

However, a significant flaw in such experimental designs of games and aggression commonly exists. Specifically, there is a drastic difference in pace of gameplay between *Mortal Kombat*, which consists of multiple stages in which the only objective is to fight one's opponents in "real time," and *Corner Pocket*, a pool-based game requiring careful focus. Therefore, given tempo alone, it is no surprise that such significant differences in arousal existed. While it is worthy of note that two forms of the same game produced significant differences in arousal, this difference could be linked to blood content alone. As the sight of blood can have variable physiological effects (e.g. excitation, nausea, fear) this cannot be directly attributed to aggression. This also displays a skewed spectrum in which a difference in arousal is explainable by means other than aggression, such as the "altruism versus revenge" example provided by the Fleming and Rickwood experiment to explain a lack of aggressive mood.

Indeed, other work, such as the study conducted by Ivory and Kalyanaraman (2007), represents those that have considered the phenomena of games and aggression more expansively. Specifically Ivory and Kalyanaraman examined the effects of old versus new technology on post-game self-perception and supported that recency of technology, not presence of violent content, is what increased self-reported immersion and measured physiological arousal. Though this study yielded ambiguous results concerning state hostility, no significant relationship between violence and aggressive thoughts was found.

While there are over a thousand available articles, spanning four decades since concerns were raised over *Death Race* in 1976 which claim that participation in violent videogames results in aggressive affect, hostile thoughts, and aggressive behaviors, this topic remains debated, with many failing to find relationships (e.g., Cicchirillo & Chory-Assad, 2005; Scott, 1995) and still others supporting mixed results (e.g., Anderson & Dill, 2000).

Trait Aggression as a Factor on Game Selection

Though much study revolves around the effects of videogame violence on aggression, there are few sources that examine trait aggression as a motivator for general game selection, and they generally contradict one another. These studies and articles, such as the literary analysis of Leone and Paradise (2013), collectively explore the "downward spiral model," which claims that the pursuit of violent media ultimately affects and reinforces aggressive behaviors and attitudes and is actually a result of an already-present high level of trait aggression. As a result, the aggressive subject in question seeks out violent games, which validate his aggression and inspire continued engagement in violent gameplay. An extension of this concept can be made to include game selection as it relates to personality, with naturally aggressive personalities seeking out more violent games and adopting a more aggressive play style.

Paradise (2007) indicated that while playing a violent videogame resulted in more aggressive thoughts, no relationship was found between trait aggression and said aggressive thoughts. Subjects in the study played a non-violent game, *Tetris*, or a violent game, *24: The Game*. In the latter game, subjects were exposed to multiple scenarios in which violent acts could be committed, and while there was no apparent relationship between trait aggression and susceptibility to aggressive thoughts, a substantial range of violent in-game acts was recorded. Subjects, on average, committed 111 acts in each 12-minute gaming segment, with a minimum

count of 57 and a maximum count of 255. Paradise proposed that play style and trait aggression corresponded with overall aggression, though results failed to validate such a claim. Also, the study suggested that prior experience with the television show upon which *24: The Game* is based resulted in significantly more violent acts than those with no exposure to the show. Such findings indicate that subjects who were familiar with the content may have been eliciting a primed behavior. Specifically, those with prior knowledge of the show were "acting out" the role of the main character, thus contributing data not reflective of their own actual aggression. Furthermore, subjects with both exposure to the show *24* and high trait aggression performed more violent acts than did subjects with exposure to *24* and low trait aggression, though this effect was not significant.

Another study examining the effects of trait aggression on aggressive gameplay (Peng, Liu, & Mou, 2008) found a positive correlation between the two, with highly aggressive individuals engaging in more frequent violent activities in-game. Subjects played one of two violent videogames (*The Godfather* or *True Crime: Streets of LA*), and overall gameplay aggression was measured using frequency of aggressive exchanges, nonviolent exchanges, bodily attacks, firearm usage, and severe or mild consequence percentages. Results of the study suggested that players high in trait aggression prefer violent videogames and play them more violently than those low in aggression.

Przybylski, Ryan, and Rigby, in their 2009 study on motivation in game selection, conducted a study examining the effects of in-game violence and trait aggression on motivation and enjoyment of gameplay. Quoting a previous study by McCarthy, Curran, and Byron (2005), they suggested consumers engage in violent videogames not for the violence, but for freedom of choice. Players may achieve skill development and achievement, as well as abstract ideals such

as honor and respect, contributing to a more positive self-affect. The authors purported that motivation for engagement in violent and nonviolent videogaming existed to the extent that the player's psychological needs were being met, with needs being competence, autonomy, and relatedness. However, individuals low in aggression were expected to dismiss games due to dissonance experienced from violence and gore. The researchers discovered significance between trait aggression and future game preference, with players low in trait aggression preferring non-violent games. Players with high aggression showed no clear preference on the basis of presence of violence, but ultimately reported violent games as more interesting.

Though a myriad of studies have been conducted to investigate the link between video games and aggression, only a handful of studies have investigated the possibility that aggression level affects video game selection. Furthermore, no study exists which extends existing literature to an examination of trait aggression and non-video game preference. Therefore, this study will seek to build upon previous research in an attempt to determine the relationship between aggression and game preference, both video and non-video. If the findings of Leone, Paradise, Przybylski, Ryan, and Rigby are correct in suggesting that individuals higher in trait aggression are more likely to engage in violent videogame play, it is predicted that such individuals will also be more likely to engage in aggressive physical gaming (such as contact sports or tabletop "war games") compared to those with low trait aggression.

A wide array of demographics could also contribute to game preference, as past studies have suggested some mediating influences. For example, lower socioeconomic standing (SES) has been positively correlated with violent game preference and aggressive behavior (Griffiths, 1999) and low social immersion has similarly been linked to aggressive tendencies (Loeber, 1990). In addition to gender, SES, social immersion, ethnicity, age, GPA, and gameplay history

and frequency (which are expected to increase violent preference), demographic data will include religious involvement (which is expected to decrease violent preference).

Method

Participants:

Ninety-two psychology students (29 male, 63 female) from Texas A&M University—Commerce were recruited online via SONA experimental system for participation in this study. Samples consisted of 25 African American, seven Asian, nine Hispanic, one Native American, 25 white, and 3 "other" students, ranging from age 18 to 55 (with a mean age of about 23). Students had completed varying levels of education and represented each category of GPA, gaming experience, and gaming frequency. Subjects received experimental credit to be used in applicable psychology courses. All fully completed surveys were included in final results.

Materials:

Subjects completed three related surveys online for this study.

A game type omnibus survey containing 19 questions about frequency of play time per game type was administered. Type selection was indicated through the use of sliders. Sliders were moved to the percent frequency with which subjects participated in the indicated game type, the final sum of each frequency necessarily totaling 100% before the next question could be accessed. Skip logic was implemented to reduce survey time in the event that the participant did not engage in gameplay for games that were further stratified in the survey. The game type omnibus condensed game genres into stratified, concrete categories through analysis of gameplay factors, beginning with delineations between tangible and virtual games. Further genre distinctions were made on the basis of play setting, material, strategy, interpersonal interaction, and level of need for physical interaction, with "contact" requiring repeated physical interaction

with opponents for gameplay, "limited contact" involving only incidental physical interaction with opponents, and "non-contact" involving no element (even incidentally) of physical interaction with opponents. During completion of the omnibus, subjects were provided with descriptions and examples of each game type and instructed to indicate the percent of total game time they delegate to each. Construct validity was not formally computed for this instrument, as it was designed specifically by Tracy Henley, John Pollock, and myself for this and one other study.

The Buss-Perry Aggression Questionnaire (BPAQ), which in this study was constructed on a 7-point Likert scale of 29 questions, was also implemented. Choices ranged from 1 (extremely uncharacteristic) to 7 (extremely characteristic), with 4 falling in the middle (neither uncharacteristic nor characteristic of me). Two questions within the BPAQ, "I can think of no good reason for ever hitting a person" and "I am an even-tempered person," were reverse-scored. The BPAQ provided a measure of trait aggression, accounting for norms relating to gender as well as personality variants among subjects, and ignored state aggression, which could potentially result in false readings in data analysis. As the study hoped to uncover the possible relationship between inherent aggression and game preference, the BPAQ addressed this need most effectively. The BPAQ was broken down into four aggression categories: physical aggression, verbal aggression, anger, and hostility. Physical aggression questions contained references to physical violence and threats of violence. Verbal aggression questions involved argumentation and disagreement. Anger was represented through emotional instability and reactivity. Hostility included jealous tendencies, feelings of resentment, mistrust, and paranoia. Internal consistency coefficients for the aggression subcomponents were: physical aggression,

$\alpha = 0.85$; verbal aggression, $\alpha = 0.72$; anger, $\alpha = 0.83$ and hostility, $\alpha = 0.77$. Test-retest reliability fell between $\alpha = 0.72$ and $\alpha = 0.80$. Scores were calculated for each subcomponent of aggression, as well as overall aggression.

An 11-question demographic survey was also included. Demographic information such as age, level of education, ethnicity, gender, gameplay history, and gameplay frequency were evaluated via multiple choice selections. Religious involvement, SES, and social immersion were evaluated on a 5-point Likert scale, and ratings for each demographic were compiled into a percentile.

Procedure:

Subjects first read and electronically signed an informed consent document explaining the purpose of the study: to investigate the relationship between personality traits and game preference. Subjects then completed the game type omnibus, the BPAQ, and a short demographic survey. Altogether the study took less than 45 minutes to complete.

Subsequent data analyses followed, with the intention of exploring potential correlates between high trait aggression and physically aggressive or thematically violent games. Further analysis was performed between aggression and game preference for each gender. Additionally, in a way not inclusive of gender distinctions, data was divided between subjects with preference for shooter and non-shooter games, due to shooter games' alleged involvement in violent acts. Subjects qualified for shooter-preference if percent shooter involvement was above 30% within overall videogames. Demographic information was similarly analyzed for possible game type correlates. Statistical significance was evaluated at $p < 0.05$.

Results

A Pearson's correlation analysis was conducted for trait aggression (subtypes and overall)

Table 1: Correlations between Aggression and Game Type

Game Type	Physical Aggression	Verbal Aggression	Anger	Hostility	Total Aggression
All Non-Video	—	-.28**	—	—	—
All Video	—	.28**	—	—	—
All Action	.21*	—	.31**	—	—
More Violent Games					
All Sports	—	-.22*	—	—	—
Action Fighting	.43**	—	—	—	—
Less Violent Games					
Action Pinball	-.38**	.40**	—	-.32*	-.41**
Board Abstract Strategy	—	-.28*	—	—	—
Simulation Management	—	—	-.34*	—	—

* $p < 0.05$. ** $p < 0.01$.

and game preference. Some significance was found for the effects of trait aggression on game preference, with subjects high in physical aggression and anger reporting preference for action videogames and those high in physical aggression, hostility, and total aggression reporting low preference for pinball, as shown in Table 1. Pinball players did display noteworthy verbal aggression, however. The strongest correlation between any subtype and game existed between physical aggression and fighting videogames, $r(48) = .43$, $p < .01$.

Table 2 displays consistent mean trends in gender-specific game preference—as reported from an independent-samples t-test—with female subjects generally preferring non-violent games of both media (physical and video) and males preferring games with aggressive themes. In fact, significance of $p < 0.001$ was discovered for trivia games and casual, rhythm, pinball, and visual novel videogames, which indicated distinct female preference for non-violent gaming. This reflects historic data on the respective aggressiveness inherent in each gender. (Billiard games are of significant note due to both marked male interest and lack of aggressive in-game experience, as are rail shooters and rogue-like RPGs for pronounced female involvement and

Table 2: Correlations Between Gender and Game Preference Means

Game Type	Male	Female
All Non-Video*	39.31	52.87
All Card*	9.34	17.87
All Video*	60.69	47.13
More Violent Games		
Ball Contact**	46.86	24.39
Tabletop RPG**	30.5	10.12
Board Empire*	36.58	19.17
All Video Shooter**	18.59	7.86
All Video Action/Adventure*	12.31	6.37
Action MOBA**	44.61	12.13
Shooter Third-Person*	40	23.17
Shooter Rail**	1.88	10.29
RPG Rogue-like*	7.88	20.05
Less Violent Games		
Bar Billiard*	60.55	28.25
Bar Trivia***	2.55	24.54
All Tabletop Board**	30.46	52.33
All Video Simulation**	2.28	7.51
Video Casual***	1.48	23.27
Video Rhythm***	1.24	7.19
Action Ball Paddle*	7	26
Action Pinball***	1.89	15.67
Adventure Visual Novel***	6.23	31.23

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$
RPG—Role-Playing Games
MOBA—Multiplayer Online Battle Arena

presence of thematic violence.) Additionally, male subjects preferred videogames and females preferred physical games.

Due to potential confounds in aggression-preference correlations, subject data was divided between male and female subjects and Pearson's correlation was again run for trait aggression and game preference. Tables 3 and 4 report data for men and women, respectively. Results for men indicated only inverse relationships for physical aggression (limited contact ball sports, tabletop RPGs, and video RPGs) and mostly inverse relationships for verbal aggression (general sports, limited contact ball sports, rail shooters, trivia, and pinball). Males who scored

Table 3: Correlations between Aggression and Game Type for Males

Game Type	Physical Aggression	Verbal Aggression	Anger	Hostility	Total Aggression
All Sports	—	-0.41*	—	—	—
All Sports Ball	—	—	—	-0.37*	—
More Violent Games					
Ball Limited Contact	-0.37*	-0.54**	—	—	—
Tabletop Miniatures	—	—	—	0.39*	—
Tabletop RPG	-0.37*	—	—	—	—
Sports Skate	—	—	0.55**	—	—
All Video RPG	-0.46*	—	—	—	—
RPG MMORPG	—	—	—	0.43*	—
Action Fighting	—	—	—	-0.41*	—
Shooter Third-Person	—	—	—	0.53**	—
Shooter Rail	—	-0.45*	—	—	-0.41*
Action/Adventure Horror	—	—	0.38*	—	—
Adventure Text	—	0.43*	—	—	—
Strategy Real-Time	—	0.37*	—	—	—
Less Violent Games					
Bar Billiards	—	—	0.42*	—	—
Bar Trivia	—	-0.38*	—	—	—
Board Chance	—	—	0.47**	—	—
Board Creative	—	—	0.46*	—	—
Action Pinball	—	-0.42*	—	—	-0.4*
Adventure Visual Novel	—	—	—	-0.39*	-0.4*
Simulation Management	—	—	—	—	-0.37*

* $p < 0.05$. ** $p < 0.01$.
RPG—Role-Playing Game
MMORPG—Massively Multiplayer Online Role-Playing Game

high in verbal aggression preferred text and real-time strategy games, however. Males scoring high in anger showed preference for skating sports, horror videogames, billiards, and both chance and creative board games. Involvement in miniature games, third-person shooters, and MMORPGs corresponded positively with hostility, which corresponded negatively with ball sports, action fighting games, and visual novel games. Male hostility showed inverse relationships with third-person shooters, pinball, visual novels, and simulated management videogames. Female aggression showed inverse relationships with games in general, with the

Table 4: Correlations between Aggression and Game Type for Females

Game Type	Physical Aggression	Verbal Aggression	Anger	Hostility	Total Aggression
All Sports Ball	—	—	-0.25	—	—
All Sports BPR	-0.29*	—	—	—	—
All Video Action	0.26*	—	0.35**	—	—
All Video Adventure	-0.3*	—	-0.29*	-0.28*	-0.31*
All Video Sports	-0.26*	—	—	—	—
More Violent Games					
Tabletop Simulated Sports	-0.27*	—	—	—	—
All Video Shooter	-0.33**	—	—	—	—
Shooter FPS	-0.28*	—	—	—	—
Shooter Third-Person	-0.31*	-0.3*	-0.27*	—	-0.32*
Action Fighting	0.25*	—	—	—	—
Action/Adventure Stealth	-0.27*	—	-0.33**	—	-0.3*
Adventure Text	-0.28*	—	-0.25*	-0.33**	-0.32**
Adventure Graphic	—	—	-0.26*	—	-0.28*
Simulation Living	—	-0.25*	—	—	—
Sports Sports	-0.32**	—	—	—	—
Sports Fighting	-0.3*	-0.33**	—	—	—
Less Violent Games					
All Bar	-0.29*	—	—	—	—
Bar Billiards	—	-0.36**	—	—	—
Card Casino	—	-0.36**	-0.26*	—	-0.27*
BPR Non-contact	-0.32*	—	—	—	-0.29*
Tabletop Casino	-0.29*	—	—	—	—
Board Abstract Strategy	—	-0.28*	—	—	—
Video Casual	0.32**	0.32**	—	0.36**	0.34**
Action Pinball	-0.25*	-0.3*	—	—	-0.28*
Simulation Management	—	—	-0.32*	—	-0.29*

* $p < 0.05$. ** $p < 0.01$.
BPR—Ball/Paddle/Racket
FPS—First-Person Shooter

exception of general action (physical aggression and anger), action fighting (physical aggression), and casual videogames (all but anger).

Pearson's correlative analysis for social immersion's, religiosity's, and SES's effects on violent game preference failed to produce consistent results, as reported in Table 7. Low social immersion did produce increased preference for RPGs, rail shooters, and fighting videogames, as

Table 5: Correlations between Scale Demographics and Game Type

Game Type	Social Immersion	Religiosity	SES
All Non-Video	—	—	.23*
All Card	—	—	-.24*
All Sports	—	—	.23*
All Video	—	—	-.23*
More Violent Games			
All RPG	-.23*	—	—
RPG Tactical	—	—	.39*
Action MOBA	—	-.38**	—
Action Platformer	.34*	—	—
Shooter Shoot'em Up	—	—	-.28*
Shooter Rail	-.29*	—	—
Strategy Tower Defense	—	—	.35*
Sports Sports	.38*	—	—
Sports Fighting	-.38*	—	—
Less Violent Games			
Video Rhythm	—	.28**	—
Card Casino	—	—	-.30*
Card Family	—	—	.24*
Board Abstract Strategy	-.29*	—	—

* $p < 0.05$. ** $p < 0.01$.
RPG—Role-Playing Game
MOBA—Multiplayer Online Battle Arena

well as abstract strategy board games. However, low social immersion also resulted in low preference for platformer and sports videogames, which were also noted as containing aggressive content. High religiosity resulted in reduced preference for MOBAs, but this was the only violent game for which such a correlation existed. High SES actually correlated positively with tactical RPGs and tower defense games, in spite of predicted affinity for non-violent games. Those testing higher in SES also seemed to prefer physical gaming to video gaming, $r(92) = .23$, $p < .05$.

Dividing data between shooter and non-shooter preference resulted in insufficient sample size; as a result, data obtained in analysis provided no additional or compelling results. Analysis of additional demographic data also provided no compelling results.

Discussion

It is possible that players who demonstrate high levels of physical aggression appear to be drawn to aggressive games at the high extremes, as is evidenced in the positive correlation with action fighting games (not to be confused with "sports fighting" videogames, which include titles like *WWE* and *Fight Night*) for the overall sample. This is also evidenced by the overall disinclination for pinball, limited contact ball sports, stealth games, and non-contact ball/paddle/racket games, each of which definitively involves little physical interaction with others. Players higher in verbal aggression may prefer videogames because they can avoid repercussions of aggressive speech that would be inevitable when in the physical presence of other competitors. This could also explain apparent affinity for pinball, as it is a single-player game; thus, there are no chances of speaking harshly against another individual. Less interest in sports further supports this, as there may be clear and present danger in insulting athletic competitors. Implications of the involvement of trait aggression in game preference grow stronger with the higher action videogame and lower simulated management involvement by those scoring high in anger, as well as the lack of pinball involvement in those scoring high in hostility and total aggression. Combined, these findings support the notions of authors who claim a link between high trait aggression and more violent games (Leone & Paradise, 2013; Peng, Liu, & Mou, 2008; Przybylski, Ryan, & Rigby, 2009; McCarthy, Curran, & Byron, 2005).

Results do beg the question "Is there a significant extent to which gender could be the deciding factor for game preference?" however. In truth, high levels of understandable significance were found on the bases of gender, with males generally preferring more violent games and females generally preferring less violent games. After all, seven of the nine violent games for which a relationship with gender was shown reported male preference, while eight of

the nine non-violent games reported female preference. This evidence suggests that gender identity could have a strong determinant effect on game preference. Further still, once divided by gender the effects of trait aggression alone on game preference became less apparent.

For men, significant relationships were found in sensible ways. For example, those high in verbal aggression preferred real-time strategy videogames and were disinclined to be involved in sports, limited contact sports, and pinball, those high in anger were quite likely to be involved in skating sports and horror games, both of which typically contain great degrees of violence. For hostility, positive relationships were found for more violent games (miniatures, third-person shooters, and MMORPGs) and negative relation was found for visual novels. However, upon examining females, most significant relationships between trait aggression and game types were negative for both more violent and less violent games, with few exceptions. Although preference for action fighting videogame still aligned with higher physical aggression, the overall shooter category (as well as subtypes first-person shooter and third-person shooter) did not, nor did sports fighting videogames. Furthermore among women, those involved in more third-person shooters (highly violent) scored low in all aggression but hostility (no significance), and those involved in more casual videogames (highly non-violent) scored high in all aggressions but anger (no significance). This data suggests that as females become more aggressive, preference for gaming in general declines. While these findings do not necessarily invalidate the effects of trait aggression on game preference, they do suggest that gender may play a significant role in the games one plays.

Scale demographics such as social immersion, religiosity, and SES may also play a mediating role in game preference. For each variable, it was anticipated those high in each category would show less interest in more violent games and more interest in less violent games,

and results seem to show this. As was suggested by Loeber (1990), those scoring high in social immersion seem to show significant disinclination for violent content (role-playing, rail shooting, and sports fighting videogames). Furthermore, data indicated that those high in SES possessed an affinity for family card games and a dislike of shoot'em up videogames, supporting claims built from the findings of Griffiths (1999). There may be less interplay between this variable and game preference, as subjects high in SES also preferred tactical RPGs and tower defense games, though interest in these games may be explicable by non-violent in-game factors associated with these game types. Inclusion of religiosity in subjects' lives also seemed to play a role in preference, with those high in religiosity preferring highly non-violent rhythm videogames and avoiding highly aggressive MOBA videogames.

Some interval demographics show potential for involvement in game preference, though likely not at the more violent/less violent level. Most notably, frequency of weekly gameplay produced interesting but unsurprising correlations for physical and video games. Those who participated in gaming at the highest levels of weekly involvement appear to have a preference for videogames, which are unrestricted in gameplay length, while physical and card games (which shared a negative correlation with frequency) are generally dependent upon the presence of other people and these individuals' time availability. Few relationships were found for remaining demographics, so age, gameplay experience, GPA, and educational level are unlikely to have mitigating influence in game preference.

Unfortunately, much of this data is not as definitive as could be hoped. Dichotomizing games between those that are more violent and those that are less may be simpler, but such dichotomizations fail to take into account type of violence or aggression present in specific games. As such, derivations and assertions can be made as to the inverse relationships between

some more violent games and subtypes of aggression, but these explanations cannot be clearly presented in a table. For example, *Civilization* is not typically considered a violent game due to its city-building, scientific, cultural, and historical content; however, political disputes regularly emerge in-game, and a clear pathway to victory lies in destroying all opponents. Similarly, games like *Thief* may include the potential for high amounts of violence, but canon play involves low levels of abject violence, instead encouraging stealth and discretion. It is possible that isolating games based on presence of specific trait aggression and testing subject affinity for those games could provide more compelling evidence. It is also possible that unexpected relationships could be explained by some other attractant model, like altruistic violence (Fleming & Rickwood, 2001), behavioral priming (Paradise, 2007), or needs fulfillment like freedom of choice, honor, or excitement (McCarthy, Curran, & Byron, 2005).

The involvement of trait aggression in game type predisposition is sadly underexplored in the academic world, in spite of the apparent connections between the two. Further research into this field is especially advised, given that this study serves as compelling evidence against the assertions that in-game violence will predispose one to actual violence, and data clearly suggests that game preference may be the work of an already-present level of aggression. What significance exists in the relationship of these variables can be and has been explained both understandably and rationally, while apparent contradictions can be interpreted as involving other deterministic factors like gender, social immersion, religiosity, and SES.

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Appendix A

Game Type Omnibus

1. Please indicate the amount of time you dedicate to each of the following game types. (Total must add to 100%.)

   Physical—requiring no electrical components and involving physical exertion

   Video—requiring electronic components, such as a computer or gaming console

2. Please indicate the amount of time you dedicate to each of the following physical game types. (Total must add to 100%.)

   Bar—traditionally played in a bar

   Card—requiring cards

   Social—involving a group and primarily consisting of social interaction and verbal exchange

   Sports—requiring physical exertion and mobility

   Tabletop—traditionally requiring a board, table, or other flat surface

3. Please indicate the amount of time you dedicate to each of the following bar game types. (Total must add to 100%.)

   Billiards—requiring a cue stick (i.e. pool)

   Darts—a game in which one throws pointed darts at a scoreboard

4. Please indicate the amount of time you dedicate to each of the following card game types. (Total must add to 100%.)

   Casino—typically played in a casino or other gambling setting with a standard 52-card set (i.e. poker, blackjack, etc.)

   Collectible/Trading—involving the building of a deck of cards in order to compete with another player (i.e. Pokémon, Magic: The Gathering, Yu-Gi-Oh, etc.)

Family—requiring no gambling and typically played using a standard 52-card set (i.e. Go-fish, Skip-Bo Uno, etc.)

5. Please indicate the amount of time you dedicate to each of the following social game types. (Total must add to 100%.)

   Contact—involving physical contact with other players (duck-duck-goose, red rover, etc.)

   Narrative—consisting primarily of story-telling and requiring verbal exchange between players (mafia, werewolf, etc.)

6. Please indicate the amount of time you dedicate to each of the following sports game types. (Total must add to 100%.)

   Ball—requiring no more equipment than a ball to play (i.e. soccer, volleyball, etc.)

   Bat/Paddle/Racket/etc.—requiring a tool such as a bat or paddle to interact with a ball, puck, or other item (i.e. tennis, ping-pong, etc.)

   Disc—requiring a disc, such as a Frisbee

   Skating—requiring skates

7. Please indicate the amount of time you dedicate to each of the following ball sports game types. (Total must add to 100%.)

   Contact—requiring physical interaction with the bodies of other players (i.e. American football, rugby, etc.)

   Limited Contact—not requiring but often involving physical interaction with the bodies of other players (i.e. soccer, basketball, etc.)

   Non-contact—not involving physical interaction with the bodies of other players (i.e. polo, four-square, water polo, etc.)

8. Please indicate the amount of time you dedicate to each of the following bat/paddle/racket/etc. sports game types. (Total must add to 100%.)

   Contact—requiring physical interaction with the bodies of other players (i.e. lacrosse, hockey, etc.)

   Limited Contact—not requiring but often involving physical interaction with the bodies of other players (i.e. baseball, softball, etc.)

   Non-contact—not involving physical interaction with the bodies of other players (i.e. cricket, ping-pong, tennis, etc.)

9. Please indicate the amount of time you dedicate to each of the following tabletop game types. (Total must add to 100%.)

   Board—requiring a game board for navigation or scoring

   Casino—typically including a casino setting (i.e. craps, roulette, etc.)

   Miniatures—consisting of collectible miniature pieces used in combat-focused play (i.e. Rogue Squadron, Warhammer 40K, etc.)

   Role-playing—consisting primarily of story-telling elements and adoption of a false persona (i.e. Dungeons & Dragons)

   Simulated Sports—imitating a real sport in a miniaturized, non-contact form lacking cardiovascular exercise (i.e. Foosball, air hockey, etc.)

10. Please indicate the amount of time you dedicate to each of the following tabletop board game types. (Total must add to 100%.)

    Abstract Strategy—involving gameplay in which effects of chance are minimized (i.e. chess, checkers, Clue, etc.)

Chance—involving gameplay in which chance is the main determinant for success (i.e. The Game of Life, Battleship, etc.)

Creative/Intellectual—consisting of artistic or literary gameplay (i.e. Pictionary, Scrabble, Cranium, etc.)

Empire-building/Resource Management—involving expansion of territories and maintenance of resources (i.e. Settlers of Cataan, Risk, Monopoly, etc.)

11. Please indicate the amount of time you dedicate to each of the following video game types. (Total must add to 100%.)

Action—Involving timing, accuracy, and quick reflexes accomplish objectives. (Street Fighter, DotA, Pinball, etc.)

Shooter—Involving combat focused on projectile weapons. (Call of Duty, Gears of War, Halo, etc.)

Action/Adventure - Involving item collection, puzzle solving, and puzzle-based combat. (Silent Hill, Super Metroid, Splinter Cell, etc.)

Adventure—Consisting of puzzle-based gameplay without reflex challenges. (Myst, Zork, visual novels, etc.)

Role-Playing—Involving placing the player in the role of an adventurer and progressing through a predetermined story. (Diablo, World of Warcraft, Final Fantasy, etc.)

Simulation—Consisting of gameplay that simulates aspects of reality or a fictional world. (The Sims, Forza, Neopets, Spore, etc.)

Strategy—Involving careful forethought and planning to succeed. (Civilization, Starcraft, The Banner Saga, etc.)

Sports—Involving simulation of physical sports through a virtual medium. (Madden, NBA 2K series, FIFA, etc.)

Casual—Consisting of simple requirements for advancement and the ability to stop at any point without losing much (if any) progress. (Angry Birds, Candy Crush, Words With Friends, etc.)

Rhythm—Consisting of the player inputting rhythms on a physical device such as a dance pad, drum kit, etc. (Rock Band, Dance Dance Revolution, Guitar Hero, etc.)

12. Please indicate the amount of time you dedicate to each of the following action video game types. (Total must add to 100%.)

    Ball and Paddle—Pong, Breakout, etc.

    Pinball—Simulated pinball cabinets

    Fighting—Street Fighter, Injustice: Gods Among Us, etc.

    MOBA (Multiplayer Online Battle Arena)—DotA, League of Legends, Heroes of the Storm, etc.

    Platformer—Mario, Pitfall, Rayman, etc.

13. Please indicate the amount of time you dedicate to each of the following shooter game types. (Total must add to 100%.)

    First-person—Halo, Call of Duty, etc.

    Shoot 'em up—Space Invaders, Galaga, Mushihimesama, etc.

    Tactical—Ghost Recon, SOCOM, etc.

    Third-Person—Gears of War, Ratchet and Clank, etc.

    Rail—The House of the Dead, Captain Skyhawk, etc.

14. Please indicate the amount of time you dedicate to each of the following action/adventure game types. (Total must add to 100%.)

    Stealth—Splinter Cell, Sly Cooper, etc.

    Survival Horror—Silent Hill, Resident Evil, etc.

    Metroidvania—Super Metroid, Castlevania: Symphony of the Night, etc.

15. Please indicate the amount of time you dedicate to each of the following adventure game types. (Total must add to 100%.)

    Text—Zork, Colossal Cave Adventure, etc.

    Graphic—Monkey Island, Shadowgate, Myst, etc.

    Visual Novel—Long Live the Queen, Hatoful Boyfriend, If My Heart Had Wings, etc.

16. Please indicate the amount of time you dedicate to each of the following role-playing game types. (Total must add to 100%.)

    Action—Diablo, Path of Exile, etc.

    MMORPG—World of Warcraft, Albion Online, etc.

    Tactical—Baldur's Gate, Pillars of Eternity, etc.

    Sandbox—The Elder Scrolls, Fable, Dark Souls, etc.

    Roguelike—The Binding of Isaac, Spelunky, etc.

17. Please indicate the amount of time you dedicate to each of the following simulation game types. (Total must add to 100%.)

    Life—Spore, Tomagotchi, Petz, etc.

    Vehicle—Forza, Microsoft Flight, etc.

    Management—SimCity, Game Dev Tycoon, etc.

18. Please indicate the amount of time you dedicate to each of the following strategy game types. (Total must add to 100%.)

    4X (eXplore, eXpand, eXploit, eXterminate)—Civilization, Sins of a Solar Empire, etc.

    Real-Time—Command and Conquer, Starcraft, etc.

    Tower Defense—Plants vs. Zombies, Dungeon Defenders, etc.

19. Please indicate the amount of time you dedicate to each of the following sports game types. (Total must add to 100%.)

    Sports—FIFA, Madden, etc.

    Fighting—Fight Night, WWE 2K, etc.

Appendix B

Buss-Perry Aggression Questionnaire

Physical Aggression

1. Once in a while I can't control the urge to strike another person.	1 2 3 4 5 6 7
2. Given enough provocation, I may hit another person.	1 2 3 4 5 6 7
3. If somebody hits me, I hit back.	1 2 3 4 5 6 7
4. I get into fights a little more than the average person.	1 2 3 4 5 6 7
5. If I have to resort to violence to protect my rights, I will.	1 2 3 4 5 6 7
6. There are people who pushed me so far that we came to blows.	1 2 3 4 5 6 7
7. I can think of no good reason for ever hitting a person.*	1 2 3 4 5 6 7
8. I have threatened people I know.	1 2 3 4 5 6 7
9. I have become so mad that I have broken things.	1 2 3 4 5 6 7

Verbal Aggression

10. I tell my friends openly when I disagree with them.	1 2 3 4 5 6 7
11. I often find myself disagreeing with people.	1 2 3 4 5 6 7
12. When people annoy me, I may tell them what I think of them.	1 2 3 4 5 6 7
13. I can't help getting into arguments when people disagree with me.	1 2 3 4 5 6 7
14. My friends say that I'm somewhat argumentative.	1 2 3 4 5 6 7

Anger

15. I flare up quickly but get over it quickly.	1 2 3 4 5 6 7
16. When frustrated, I let my irritation show.	1 2 3 4 5 6 7
17. I sometimes feel like a powder keg ready to explode.	1 2 3 4 5 6 7
18. I am an even-tempered person.*	1 2 3 4 5 6 7

19. Some of my friends think I'm a hothead. 1 2 3 4 5 6 7

20. Sometimes I fly off the handle for no good reason. 1 2 3 4 5 6 7

21. I have trouble controlling my temper. 1 2 3 4 5 6 7

Hostility

22. I am sometimes eaten up with jealousy. 1 2 3 4 5 6 7

23. At times I feel I have gotten a raw deal out of life. 1 2 3 4 5 6 7

24. Other people always seem to get the breaks. 1 2 3 4 5 6 7

25. I wonder why sometimes I feel so bitter about things. 1 2 3 4 5 6 7

26. I know that "friends" talk about me behind my back. 1 2 3 4 5 6 7

27. I am suspicious of overly friendly strangers. 1 2 3 4 5 6 7

28. I sometimes feel that people are laughing at me behind my back. 1 2 3 4 5 6 7

29. When people are especially nice, I wonder what they want. 1 2 3 4 5 6 7

Appendix C

Demographics

1. How old are you?

   Under 13

   13-17

   18-25

   26-34

   35-54

   55-64

   65 or over

2. What is your ethnicity?

   White/Caucasian

   African American

   Hispanic

   Asian

   Native American

   Pacific Islander

   Other

3. What is your gender?

   Male

   Female

4. How long have you been playing games of any kind?

   0-12 Months

1-2 Years

2-5 Years

5+ Years

5. With what frequency (in hours per week), if any, do you play games of any kind? (If you currently do not engage in game play for situational reasons, with what frequency would you play games if able?)

   0

   1-2

   3-4

   5-9

   10-15

   15+

6. What is the highest level of education you have completed?

   Less than High School

   High School / GED

   Some College

   2-year College Degree

   4-year College Degree

   Masters Degree

   Doctoral Degree

   Professional Degree (JD, MD)

7. How often do you think about religious issues?

   Never Rarely Occasionally Often Very Often

8. To what extent do you believe in the existence of a divine being (God, Allah, etc.)

   Not at all Not very muchModerately Quite a bit Very much so

9. How often do you take part in religious services?

   Never Rarely Occasionally Often Very Often

10. How often do you pray?

    Never Rarely Occasionally Often Very Often

11. How often do you experience situations in which you have the feeling that God or something divine intervenes in your life?

    Never Rarely Occasionally Often Very Often